

Conclusions: Dosimetric impact of swallowing is insignificant as this motion is rare, rapid and easily suppressed by patients. There is however a risk of systematic miss-targeting if the planning CT is not acquired with the larynx in resting position. Anatomic changes during treatment are associated with a laryngeal shift in a significant proportion of patients, which can justify the use of daily soft-tissue imaging in laryngeal IGRT. An 8 mm ITV margin accounting for non-swallowing laryngeal motion in PL-IMRT would allow for a safe and significant dose reduction to organs at risk.

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PATTERNS OF CARE AMONG CANADIAN RADIATION ONCOLOGISTS AND UROLOGISTS RELATED TO POST-OPERATIVE RADIOTHERAPY FOR PATIENTS WITH PROSTATE CANCER

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Purpose: The American Society for Radiation Oncology (ASTRO) and American Urological Association (AUA) developed post-prostatectomy radiotherapy (RT) guidelines to aid patient counselling regarding adjuvant (ART) and salvage radiotherapy (SRT). The objective of this study was to examine awareness and compliance of these guidelines among Canadian radiation oncologists (RO) and urologists (U).

Methods and Materials: An online 28-item survey was developed, pretested and distributed by Canadian Association of Radiation Oncology (CARO) and Canadian Urology Association (CUA) to RO and U that treat prostate cancer. Similarities and differences between RO and U were examined using Wilcoxon rank sum test and Chi-square test. Only p-values for significant findings reported.

Results: Fifty-two out of 87 RO and 76/570 U responded to the survey. Ninety percent of RO and 40% U practiced in academic centres. Eighty-two percent of RO and 49% U had read the guidelines ($p < 0.001$). Sixty-seven percent RO and 83% U always informed patients about possible adverse pathological findings post radical prostatectomy (RP). Sixty-one percent RO and 48% U inform patients about uncertainty of using ART on development of metastatic disease and overall survival ($p = 0.025$). ART was considered for seminal vesicle invasion (77% RO, 68% U), extracapsular extension (72% RO, 35% U; $p < 0.001$), and positive margin (84% RO, 57% U; $p = 0.004$). Seventy-six percent RO and 51% U recommended ART > 50% of the time for adverse pathological findings post RP ($p = 0.011$). Seventy-one percent RO and 49% U agreed that ART provided long-term biochemical control benefit but not overall survival benefit. Sixty-eight percent RO and 56% U suggest RT two to six months post-surgery. Percentage of respondents who always informed patients that detectable or rising PSA post-RP were associated with metastatic disease (36% RO, 46% U) or death from disease (21% RO, 19% U). Seventy-seven percent of RO and 93% of U always monitored post-RP PSA to enable early SRT ($p = 0.016$). Seventy-three percent RO and 84% U agreed that biochemical recurrence should be defined as detectable or rising PSA ≥ 0.2 ng/ml with second confirmatory level ≥ 0.2 ng/ml after RP ($p = 0.199$). Fifty-nine percent of RO and 43% U would always refer patients with biochemical recurrence without evidence of distant metastases for SRT, but 24% of RO and 3% of U would not. Ninety percent of RO and 70% U would inform patients that the effectiveness of RT for PSA recurrence is greatest when given at lower PSA values ($p = 0.011$).

Conclusions: Considerably less U had read the guidelines compared to RO. There was concurrence about the level of awareness for some parts of the guidelines; however, other areas had low compliance.

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DOES PEER REVIEW OF RADIATION TREATMENT PLANS IMPACT CLINICAL CARE? A SYSTEMATIC REVIEW OF THE LITERATURE
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Purpose: Peer review of radiation plans is recommended as an approach to improving patient safety and quality of care. However, peer review rounds are resource-intensive, and their impact on clinical care is not well-quantified. The objective of this study was to undertake a systematic review of the literature to assess the impact of peer review on clinical care.

Methods and Materials: A systemic review of the literature was conducted according to PRISMA guidelines, including MEDLINE, EMBASE, and abstracts from relevant radiation oncology meetings. For inclusion, studies were required to report the impact of physician peer review on at least one element of treatment planning (e.g. target volume/organ at risk delineation, dose prescription, or dosimetry). Surveys in which radiation oncologists were asked to estimate the impact of peer review on treatment planning were also included to ascertain physician perspective on the clinical impact of peer review. Studies reporting central review of contours in clinical trials were excluded. All proportions reported represent weighted averages across studies.

Results: The initial search yielded 882 potentially eligible studies. Full-text review was performed independently by two researchers, with discrepancies settled by a third. In total, 16 studies met inclusion criteria and were included in the final analysis. Twelve studies, involving 12,239 patients, reported patient outcomes whereas, four surveys reported oncologists' estimates of clinical impact. Studies were recent, with the majority (75%) published since 2010. Twelve studies reported on multiple tumour sites, while single-site studies included head and neck ($n = 1$), lung ($n = 2$), and breast ($n = 1$). In most studies, peer review occurred before the start of radiotherapy or within the first few fractions. Overall, peer review resulted in modifications to 10.7% of patient plans. Five studies differentiated between minor versus major changes and reported averages of 7.5% minor changes and 2.5% major changes. From the survey studies, oncologists estimate that modifications occurred in 6% of treatment plans.

Conclusions: Based on a systematic review of the literature, peer review results in changes in clinical care in approximately one out every nine cases overall, with major changes in approximately one out of every 40 cases. Further research is required to determine the essential elements of peer review, and to assess the impact of peer review on clinical outcomes.

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EPID-BASED IN VIVO DOSIMETRY SYSTEM FOR SBRT-VMAT: MEASURED VERSUS PLANNED DOSE

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Purpose: Physics-based assessment tools were developed to utilize transmission EPID data acquired during treatment to reconstruct in vivo 3D dose for every fraction of patients treated with stereotactic body radiation therapy (SBRT). This method provides verification of inter-fractional dose delivery to capture treatment delivery errors midway through treatment, allowing potential corrective interventions to reduce the radiobiological impact on patients given the high dose per fraction delivered in SBRT. In this study, the two-year results of our implemented EPID-based dose verification system are presented.

Methods and Materials: Based on our initial experiences, several enhancements were implemented to improve comparison between the EPID and treatment planning system 3D doses including, patient-specific EPID frame averaging optimization,

Acuros® XB commissioning for the Eclipse treatment planning system, and template development of specialized dose reports to analyze volumes defined within the patient's structure set. In total, 90 lung, 18 spine, and two liver SBRT patients were treated from January 2014 to January 2016 using Varian 2300ix model linacs operated in 6MV SRS-mode. EPID reconstructed doses for each fraction were compared to Eclipse TPS AAA and Acuros dose calculations. Low dose (20% isodose) and high dose (planning target volume, PTV) regions were analyzed using gamma (3%/3 mm). "Marginal" (< 90%) and "Suboptimal" (< 88%) pass rates were chosen based on the AAPM TG119 report. CBCTs, EPIDs, and linac output were investigated for all suboptimal fractions.

Results: Improvements up to 8% in PTV γ -pass rates were observed when frame averaging was optimized. Furthermore, average γ -pass rates in the PTV improved from $89 \pm 7\%$ (AAA) to $92 \pm 5\%$ (Acuros) for 32 lung patients, $71 \pm 15\%$ (AAA) to $89 \pm 9\%$ (Acuros) for nine spine patients, $90 \pm 3\%$ (AAA) to $94 \pm 1\%$ (Acuros) for one liver patient. This was expected as Acuros is more accurate than AAA in calculating dose within complex heterogeneous media. Reasons for suboptimal fractions were identified as: 1) changes in patient anatomy with weight loss or gain, rotations, or shifts, or 2) changes in linac output, or errors in EPID image acquisition. Specific suboptimal cases will be presented to illustrate the utility of this in vivo dosimetry technique.

Conclusions: In our study, γ -pass rates were higher using Acuros® XB for comparison and appeared to provide the most benefit in spine SBRT cases. With an increasing trend towards highly complex and high dose radiotherapy, in vivo dosimetry provides treatment verification of planned dose distributions. Furthermore, EPID in vivo dosimetry provides key information to permit adaptive radiotherapy approaches, potentially improving patient outcomes through more accurate dose delivery. Our results also highlight that complex treatments can be sensitive to changes in linac output and differences in patient orientation at the time of treatment with respect to the planning CT.

7 PREFERENCES FOR THE PROVISION OF SMOKING CESSATION EDUCATION AMONG CANCER PATIENTS

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Purpose: Many individuals who use tobacco will continue to smoke after a cancer diagnosis and throughout treatment; however, the extant literature shows that many cancer patients are highly motivated to quit at this time. Continued smoking in cancer patients undergoing various treatments results in decreased treatment efficacy, potentially increased toxicity, reduced survival and increased risk of recurrence/second malignancy. This study aims to better understand cancer patient preferences for learning about smoking cessation.

Methods and Materials: All new patients seen at Princess Margaret Cancer Centre between January 1, 2014 and June 30, 2015 were asked to complete the Combined Tobacco History Survey as part of standard new patient assessments. Details collected from this survey include smoking status, second-hand smoke exposure, years smoked, family support and cessation preferences in terms of education modality. Demographic and tumour details were retrospectively collected from electronic patient records. The proportion of patients that were interested in each educational modality were calculated and difference by age and sex reported. Factors associated with smoking cessation educational preferences in univariate analyses were investigated further using multivariable regression analyses.

Results: 9110 patients completed the survey. Among these there were 1691 smokers (17%). Forty-three percent were female and the median age was 57 years (range 18-95 years). Median years smoked was 30 years (range 0.5-80 years). Smokers included in this analysis were being treated predominantly for head and

neck, gastrointestinal, genitourinary, gynecological and lung cancers. Of 1691 smokers, 1238 (73%) were willing to consider quitting and 953 (56%) reported a readiness to quit next month. Patients were most interested in getting smoking cessation education from pamphlets (45%) followed by telephone support (39%), speaking with a healthcare professional (29%), website (15%), support group (11%) and speaking with successful former smokers (9%). According to age tertiles, younger patients (≤ 45 years) preferred receiving smoking cessation education over the telephone (50%; $p < 0.001$), while older patients (46-65 years and > 65 years) preferred smoking education to be provided in pamphlets (43% and 51% respectively; $p = 0.07$). In multivariable analyses, older patients were more likely to prefer pamphlets than younger patients OR 1.11 (95% CI: 1.01-1.23; $p = 0.03$). Sex and cancer site were not predictive of preference of education modality.

Conclusions: Among cancer patients, older patients preferred to receive smoking cessation education through pamphlets and younger patients preferred to learn about smoking cessation over telephone. This highlights the importance of developing a tailored approach to smoking cessation for different cancer patient populations. These data provide an evidence base for future program development in cancer education.

8 INTERVENTIONS TO ADDRESS SEXUAL PROBLEMS IN PEOPLE WITH CANCER

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Purpose: Sexual dysfunction in people with cancer is a significant problem. This guideline aimed to address the following question: "What is the effectiveness of pharmacologic interventions, psychosocial counselling or devices to manage sexual problems after cancer treatment?"

Methods and Materials: This guideline was created with the support of the Program in Evidence-Based Care. We searched for existing systematic reviews, guidelines and relevant primary literature from 2003-2015. Men and women were evaluated separately. No restrictions were made on cancer type or study design. When first approaching the guideline the working group chose to focus on sexual disorders commonly known to arise in people with cancer. These included decreased desire, arousal disorders, pain (in women) and erectile dysfunction (in men). Only studies that evaluated the impact of an intervention on a sexual function outcome were included.

Results: The panel made one overarching recommendation that there be a discussion with the patient, initiated by a member of the health care team, regarding sexual health and dysfunction resulting from the cancer or its treatment. The Expert Panel felt that this is vital since the additional recommendations cannot be used unless someone has taken the initiative to ask. There were numerous limitations of the existing literature. However, we made additional recommendations on 11 outcomes: six for women (sexual response, body image, intimacy/relationships, overall sexual function/satisfaction, vasomotor symptoms, genital symptoms) and five for men (sexual response, genital changes, intimacy/relationships, overall sexual function/satisfaction, vasomotor symptoms). There is a role for medication or devices in particular circumstances. Psychosocial counselling however had the largest evidentiary base for most of the outcomes.

Conclusions: To our knowledge this is the first evidence based guideline to comprehensively evaluate interventions to improve sexual problems in people with cancer. The guideline will be a